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6/24/03

IN THE US PATENT AND TRADEMARK OFFICE

Inventor: BEHAGEN et al.

File Copy

Application Ser. No.: 09/197,441

Filing Date: November 23, 1998

Attorney Docket: 21566 (Previously 1521/1))

For: A DEVICE FOR REMOTE CONTROL OF A COMPUTER BY RADIO

RECEIVED 5/6/03

Examiner: C. Grant

Group: 2611

Commissioner of Patents and Trademarks
Washington, D.C. 20231
USA

AFFIDAVIT UNDER 37 CFR 1.132

I, Nitzan Rabinowitz, am the Chief Technological Officer of Moonlight Cordless Ltd. at Ramat Gan, Israel. I have a first degree in mathematics, which I received from Ben-Gurion University, Israel, and a Ph.D in seismology, which I received from Uppsala University, Sweden. My professional specialization is in the field of applied mathematical models. I have attached a copy of my curriculum vitae with some of the most recent publications.

I am an expert consulting Moonlight Cordless Ltd. with regard to the present invention. We have read the present application and the new and amended claims, as well as the Office Action from the Examiner and the accompanying references. In support of the accompanying Response to this Office Action, I have provided additional details concerning the operation of the present invention.

Briefly, the present invention relates to a non-network device for direct remote control of a main computer, and in particular, to a system in which the non-network device features a

remote monitor and speakers which directly display the visual and audio display of the main computer, and in which the device features a remote input platform for sending instructions directly to the main computer. By "non-network" it is not meant that the computer itself is not capable of communication through a network, but rather that a network is not required for operation of the present invention. As recited in the new and amended claims, and as described in the specification, the present invention seeks to control the components of a computer, not by converging a computer and another consumer electronic appliance, but instead by dividing a single computer into two dependent, interlocking platforms, which only when combined together form a fully functional single computer. The computer is therefore remote from the computer monitor, such that the computer and the computer monitor communicate through a wireless medium. The computer monitor of the present invention is not a television, and is therefore not automatically capable of displaying television programs, as an inherent property of the device.

The present invention represents a significant, non-obvious, inventive advance over the background art such as Van Ryzin (US Patent No. 6,131,130), for example, as Van Ryzin teaches a system which is intended to *converge* the personal computer with wireless home consumer electronics audio/video devices, as indicated by the title, "System for Convergence of a Personal Computer with Wireless Audio/Video Devices...". Van Ryzin's system is clearly designed to permit the user to operate the A/V (audio/video) devices like TV and DVD from anywhere in the home by allowing the user to control such A/V devices through the personal computer, by giving comments from peripheral devices to the personal computer, which then controls the A/V devices according to the commands.

In Van Ryzin's invention, the personal computer is clearly shown as being connected to a video monitor that is acting as a television, in that it is described as being capable of displaying television programs. A television would actually require further adaptation in order to be able to act as the monitor for the personal computer, because computer monitors

and televisions have different requirements in terms of the signal received and the processing of that signal. However, no further computer monitor is described, which indicates that Van Ryzin's system is intended to use a television in place of the computer monitor.

On the other hand, Moonlight's invention seeks to control the components of a computer, not by converging a computer and another consumer electronic appliance, but instead by dividing a single computer into two dependent, interlocking platforms, which only when combined together form a fully functional single computer. The computer is therefore remote from the computer monitor, such that the computer and the computer monitor communicate through a wireless medium. The computer monitor of the present invention is not a television, and is therefore not automatically capable of displaying television programs, as an inherent property of the device. The video data that is sent to the computer monitor is compressed, which is essential to the function of the monitor in the present invention. Van Ryzin does not discuss such functionality.

There is an unmet need for, and it would be highly useful to have, a device for remote display of information on a monitor and for remotely controlling a computer, as though the user was in physical proximity to the computer.

Although Van Ryzin teaches the use of a computer that communicates with wireless audio/visual components, Van Ryzin does not demonstrate or imply the feature of separating different parts of the same computer to different parts of the same house interacting with each other as if they were in the same room. Rather Van Ryzin teaches the convergence of a personal computer with non-computer A/V devices such as a video monitor that can act as a television set.

The present invention teaches that radio wave receivers and transmitters of the present invention operate as low-frequency radio waves, most preferably in the range of from about 2.4 GHz to about 5.8 GHz, a frequency range which does not require a special license in the

United States of America. Van Ryzin, does not state, suggest, or imply such a frequency range.

The present invention features compression. The computer compresses (via hardware or software compression) the display signal, which is then received as a compressed display signal by the computer monitor. The computer then decompresses the compressed display signal in order to be able to display the display signal to the user. In contrast, Van Ryzin does not state or imply such compression. Van Ryzin clearly states the convergence of a personal computer with non-computer A/V devices such as a video monitor that can act as a television set. The system of Van Ryzin clearly depends on the remote monitor being a television set rather than a computer monitor, since a computer monitor has no tuner that could receive RF modulated video broadcasts. It could not display television programs without adaptation of the display, which is neither stated nor implied by Van Ryzin. Technically speaking, if the system of Van Ryzin would be combined with a computer monitor, the result would clearly be inoperative.

The present invention operates with digital video data, while that of Van Ryzin only operates with analog signals.

The present invention fulfills a long felt need for computers that have been divided into dependent, interlocking pieces. At the time of filing of the application, no such idea existed. It would be very useful to be able to remotely interact with different parts of a single computer.

Also, by using compression of video data before transmitting video data to the computer monitor, the present invention is able to more efficiently transmit the video data. By contrast, the system of Van Ryzin as well as other similar systems that are known in the art, are forced to use complicated protocols in order to obtain the video data, as these systems cannot actually transmit images (video data) readily.

Moonlight's wireless PC solution is pre-designed to allow the detachment of the PC-monitor from the PC. Moonlight's solution is unlike other wireless image transmission strategies, which are concerned with PC to TV solutions, that involve down scaling and degrading of the picture quality.

In the course of the development of this new technology, I realized that achieving the goal of transmitting good quality video is heavily dependent upon overcoming a few technological barriers, which have to do with the quality and performance capabilities of the compression methods used. This is especially true when external constraints, such as network constraints, require low bit rate video, to be transmitted at relatively low bit-rate.

Early experiments with standard video compression methods of the MPEG-2 standard, even those based on the "gold benchmark" of the TM5 (test model 5) and its various derivatives, of highly exhaustive direct search – full search algorithms, indicated that these methods may pose severe limitations on the ability to transmit good or even moderate quality of all the computer-generated, computer accelerated, and traditional video contents. There are several reasons for these limitations:

1. The known methods of encoding MPEG (1/2/4...) are practically indifferent to the content of the video streams they are encoding. This property is reflected in their rate control procedure, whose bit allocation management is carried out by allocating rather stiff ratios between the sizes (in bits) of the I, B, and P frames. They do not allow the ability to alter the frames-size ratios significantly and use fixed frames-size ratios all over the stream, irrespective of the frames content. In many cases, such a scheme implies excessive bit allocation. Consider for example a situation in which the stream content is rapidly changing from motion picture to plain text. Naturally, the size of the B and P frames should be significantly reduced; however, in practice the size-allocation is almost independent of the frame content, and the size reduction in the B or P frame is rather limited, resulting in an insufficient allocation of bits to the I frame, which needs far

higher allocation of bits in extreme situations (for example when a highly detailed Excel Data Base Desktop is encoded.)

2. The various Direct Search based motion estimation methods currently in use (e.g. Hierarchical search, 4ss search, gradient search, diamond search, etc.), apart from their high computational consumption, suffer from inherent drawbacks, such as the failure of the search procedures to take into account spatial correlation between an individual matched macro block and its neighboring macro blocks.

To achieve its wireless PC vision, while using inter-intra encoding of the PC's Desktop, Moonlight had to overcome the technological barriers that the industry perceived as technologically blocking bottlenecks that do not allow a practical implementation of such a concept.

Moonlight decided to pursue the development of a new "content based" compression technology, and Moonlight overcame these technologically blocking bottlenecks and succeeded in achieving the above-mentioned objectives. The original concept could not have been envisioned by others, since at that time Moonlight applied for the patent, the conventional wisdom of video compression companies was that there was no way of transferring high resolution, low bit rate, variable content video over inter-intra compression methods.

The best demonstration of the failure of the industry to envision this implementation, is displayed by Microsoft's "Smart Display". This latest Microsoft innovation tries to do what Moonlight designed in a different way, through network protocols. Since this concept cannot relate to the CODEC capabilities that Moonlight has developed, the "Smart Display" does not over overcome the technologically blocking bottlenecks and thus results in no motion video capabilities.

In closing, the above-mentioned improvements have yielded an extremely efficient compression procedure which has paved the way for the eventual realization of the Wireless PC.

Moonlight's method can download data files such as MPEG-2 clips onto our cordless PC desktop, at a rate of 2-3Mb/s for a SVGA SCREEN, a rate which is not possible without the use of compression, and would certainly not be possible according to the teachings of Van Ryzin.

I hereby certify that the above facts and statements are true and complete, to the best of my knowledge.

Nitzan Rabinowitz

Date: 10. 4. 03